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ART. X.—*Notes respecting some Indian Fishes, collected, figured, and described, by Dr. THEODORE CANTOR, late Surgeon to the Honourable Company's Marine Survey. Communicated through PROFESSOR ROYLE.*

Read 26th May, 1838.

ON a former occasion I had the honour of laying before this learned Society a collection of Molluscs and Zoophytes, from the northern part of the Bay of Bengal; I shall to-day take the liberty of calling their attention to some sketches of fishes from the same locality, and the estuaries of the Ganges, which I had an opportunity of making during my sojourn there, while discharging the medical duties on the Honourable Company's surveying vessels. By reference to the ichthyological works, from different Indian localities, of Dr. Russell, Dr. Hamilton, Baron Cuvier, and Mr. Bennet, it would appear that at least one-third, perhaps one-half, out of upwards of a hundred species, which I examined between Calcutta and the twenty-first degree of north latitude, are not noticed by the above authors. Dr. Hamilton, indeed, in the introduction to his work upon the Gangetic fishes, is of opinion, that while in the rivers above, where the tide reaches, not more than one kind in five has escaped his notice, of those found in the estuaries he has not probably described above a half, a great number of which have been noticed by Dr. Russell. The fact is, I have observed many species, which, inhabiting a more southern latitude, are brought up towards the mouths of the Ganges, by the strong flood-tide prevailing during full moon, while others only temporarily enter the rivers during the spawning season. Thus many fishes, found in abundance by Russell on the Coromandel coast, are very scarce, or not met with towards the northern part of the Bay of Bengal, and of those species from Ceylon, figured and described by Mr. Bennett,¹ I have observed none.

I shall take the liberty, without entering into descriptive and anatomical details, to point out a few of those in my collection which have not been noticed, and which I think characteristic of the northern part of the bay.

Of the Perch family, famed for its excellent qualities as food, one specimen represents a species of the genus *Datnia*, called by the natives Gung-Bhallih. Its length does not exceed ten inches;

¹ Fishes of Ceylon.

it is common in the estuaries of the Ganges, even in brackish water, and is said to be no less so on the Tennasserim coast, the Straits of Malacca, and the Persian Gulf. Its flavour is good, but as it is a rather bony fish it is less esteemed as food. When caught the fish emits a hoarse sound, not unlike a faint grunt.

To the genus *Polynemus*, I shall add a species, called by the natives *Salliah*, or *Saccolih*. It enters in shoals the mouths of the Ganges, and is equally sought by Europeans and natives for its excellent flavour, which much approaches that of the salmon. I have seen it from three to four feet in length, and eight to ten inches in depth; it appears equally plentiful all the year round, which is also the case with a nearly allied species, the *Polynemus quadrifilis* of Cuvier.

Of the family *Sparoides*, a species of *Pagrus* denominated *Cudju-Begti*, is common in the bay, but is seldom met with in the rivers. It is an excellent article of food, in flavour and quality so like the Indian perch, familiar to the residents of India under the name of *Begti*, that the natives consider these fishes closely allied. Its size, however, is much smaller than that of the former, for the common length is from ten inches to one foot, and never exceeds one foot and a half. Among the genera forming the *Scomberoides*, I have observed a greater variety of new species than in any of the others. The *Kharrah*, or Indian mackerel, a species of *Thynnus*, is rather uncommon in the estuaries of the Ganges, but is found in abundance on the Burmese coast; from whence great numbers in a dried state are annually imported into Bengal. The largest specimen I saw, measured two feet and a half in length, weighing about four pounds. The flesh of the fresh fish has but little flavour and is rather coarse, but is more esteemed when in a dried or salted state.

Of the *Caranx*, a single small specimen was caught at the Sandheads, and appeared unknown to the fishermen.

The genus *Equula* of Cuvier is very rich in species, which are all characterised by their diminutive size, their pretty shape, and brilliancy of colouring; they appear (with a few exceptions, common under the name of *Chandah* in the estuaries of the Ganges), to inhabit the southern latitudes, and the Indian Ocean. Of seven species which have come under my observation, none are useful as food; two of the rarer species were invariably found entangled in the arms of a large kind of *Medusa*.

The cartilaginous fishes abound in number and species, and are remarkable for their wide geographical distribution. The sharks,

by name, enter the rivers to a considerable distance from the sea: not long ago an unfortunate native, while bathing at Serampore, was rescued with the loss of his thigh; and many instances occurred last year where sharks, from five to nine feet in length, were caught in the fishing-nets at Sumatra-sand, opposite Calcutta, which shows that these monsters are not so rare in that part of the river as Dr. Hamilton was led to suppose.

Of the genus *Zygæna*, the hammerheaded shark, I have met with a species combining all the generic marks, much more strongly developed than in any of the four described species. The breadth of its head is nearly one-half of the total length of the fish, and each of the optic nerves is one-fourth of the total length of the body,—an unparalleled example in the animal kingdom.¹

The genus *Rhinobatus*, a beautiful connecting link between the Shurks and the Rays, is never met with at a great distance from the sea: of this I have observed a species, called by the natives Phel-lúah, and of the latter genus two, the Sunkr and the Chillish-Sunkr, all of which, notwithstanding their strong, peculiar scent and flavour, are highly approved of as excellent food by the natives, both in a fresh and dried state. The shark-skin is used by the native workmen for polishing wood and ivory.

Having called the attention of the Society to a few of those fishes which appear to me characteristic of the northern part of the Bay of Bengal, I shall now take a view of some of the known fishes of a wider geographical distribution, such, for instance, as are valued as articles of food, at the three distant points—Calcutta, Madras, and Bombay. Of these the market of Calcutta is least rich in varieties of saltwater-fish, in consequence of its greater distance from the sea. The abundance, however, makes up for what it wants in variety, and the great demand for fish affords a livelihood to a number of fishermen, who every night spread their nets in the river and the saltwater-lake.

The *Lates nobilis*, different species of *Polynemus*, and the *Mugil corsula*, cover daily the tables of European residents, who will more readily recognise those fishes under their vernacular names, as the Begtí, or Cockup, Sudjeh, Topsí (Mangoe fish), and the Indian mullet. Such of the inhabitants of Calcutta as have had an opportunity of spending a short time at the Sandheads, may to this list add a few more of those delicious fishes, which are more familiar to

¹ A Description and Figure of the *Zygæna laticeps* is published in the third Number of the Quarterly Journal of the Calcutta Medical and Physical Society.

the residents of Madras and Bombay; for instance, the Indian soles, the roll-fish, and, above all, the black and the white pomfrets, and the Bummaloh, which latter in a dried state is known in trade under the name of the Bombay duck. Of these species, to which might be added a greater number of less valued, and consequently less known, saltwater-fishes, none appear to be more widely distributed than the Indian mullet. This is common in the Straits of Malacca, the Bay of Bengal, the Persian Gulf, and the Red Sea; I have found it also one of the most valued fishes of the market at the Cape. The Indian sharks and the Hippocampi (sea-horses), widely spread and of known migratory habits, may occasionally stray from the Indian Ocean; and instances are recorded in which they have been caught on European coasts,—these are exceptions, and upon the whole I have reasons for thinking not one Indian fish is identical with any of those of the European latitudes, and although the *Clupanodon ilisha*, or Sable Fish, has by many been supposed to be identical with the shad of our seas, to which, as Dr. Hamilton observes, it bears some resemblance; yet from examination of this fish, and comparison with the *Clupea alosa*, Linn., described by Mr. Yarrell, the eminent ichthyologist,¹ I feel convinced of their non-identity.

The fertility of the Indian soil is such that the mere necessities of life are nowhere so easily acquired as there. It is well known that the amount of one rupee a month is sufficient, and does administer to the first wants of the great mass of the natives. If we inquire into the ingredients of the daily food of the poorer classes, we find it limited to rice, vegetables, and fish. Animal food is, partly by rule and partly by necessity, chiefly restricted to fishes, which thus, on the coasts and the banks of the great rivers of India, become of higher importance than in any other country. Our knowledge of the Indian freshwater-fishes is limited to the researches of Dr. Hamilton, which chiefly comprised the Ganges and its tributary streams, and his amount was between two and three hundred species. Mr. McClelland, in his late mission to Asám to investigate the tea-plant, extended his inquiries to other branches of the natural productions of that country, and the list² of his valuable zoological collections, comprise upwards of one hundred and twenty species of fish, from the Brahmaputra, one half of which do not appear in the work of Hamilton upon the Fishes of the Ganges, and belong, in all probability, exclusively to the majestic sister-river. Of those

¹ A History of British Fishes, by W. Yarrell, vol. ii. p. 131.

² Quarterly Journal of the Calcutta Med. and Phys. Society, No. III. p. 320.

inhabiting the streams of the peninsula very little is known, the researches of Dr. Russell being more directed to the inhabitants of the Bay of Bengal.

It may, perhaps, not be deemed uninteresting to look at a few of those little fishes, chiefly belonging to the Carp family, which, although unpalatable, and little esteemed by Europeans, form almost "the daily bread" to thousands and thousands of poor natives. Their modes of catching them are all of the simplest description. Such as frequent the banks of the river, for instance the numerous Gobies, are dug out of the mud by the hand, or arrested in a flat basket, which, rapidly skimming the surface, admits a free passage of the water. During irrigation, the rice-fields teem with fishes, and the natives then place across the little streamlets, traps, like bird-cages, made of slips of bamboo, which are emptied as quickly as they are filled. A common mode of fishing is afforded by a conical net, which is from five to six feet in depth, and as many feet in diameter at the wider open part; to the circumference of this is attached a number of little pieces of metal, or stones; the fisherman holds the top or apex of the cone in his right-hand, while the body of the net is collected between the flexure of his elbow and the shoulder; thus armed he wades till the water reaches his waist, when he dexterously throws the net, spreading it to its full extent; while it sinks he gently withdraws it, when the circumference, by its weight, is brought in close contact, and thus prevents the captives from slipping through.

In villages situated on the banks of the river, a number of fishermen supply the bazaars, either by dragging nets of a larger description along the banks, or by setting them in deep water across the streams.

The sea-fishery in Bengal is carried on to a very small extent, chiefly because the distance from the market is too great to allow of the carriage of the fish in a fresh state. The only class of fishermen who are provided with sea-built boats, inhabit villages situated near the entrance of the Hoogly. Their chief and most profitable employment consists in attending with their boats on the shipping entering and leaving the river, for which they receive the pay of sixteen rupees per diem. Whenever this employment fails, they resort to work with their nets, which they drag, during high-water, along the coasts of the Sunderbuns, of which locality they possess a thorough knowledge. Two or three tides are, generally speaking, sufficient to load a boat with fishes and shell-fish. The larger portion of the prize, which is not consumed or otherwise disposed of on

the spot, is then preserved. This process consists simply in dividing the fish, taking out the viscera, and spreading them in the sun till they become sufficiently dried. By repeated excursions I made in a boat of this description, attached to the surveying expedition, I can speak from experience of the truly prodigious quantity brought up in a few hauls.

A mode of fishing, followed by the Honourable Company's ships stationed at the Sandheads, is by a net, similar in form to the above, measuring sixteen feet in length, with a diameter of eight feet at the wider, open part. The net is rigged with two cross-poles: to the lower part of the vertical pole is fixed a piece of ballast-iron, to keep the net in a vertical position below the surface of the sea; the upper part is fixed to a line attached to the main yard, from which the net is lowered over the side of the vessel. An hour is sufficient, with a moderate tide, to arrest a large quantity of fishes of all sizes and descriptions: and a net for this purpose forms part of the inventory, found for the Honourable Company's ships. It must, however, be observed, that this mode of fishing is practicable only within the reach of the tide, and is, under these circumstances, sufficient to procure fresh provisions for the largest ships' companies.

The bazaars in Calcutta are always stocked with an ample supply of dry fish, which is consumed partly by the European and native shipping of that port, partly by the poorer classes of Bengal and the upper provinces. Cargoes of this article are annually imported by the Burmese and the Arabs. As no duty is levied on the importation, I have not been able to ascertain the actual amount, which, however, from the information I have obtained from European and native merchants, appears to be considerable. By examination I found these dried fishes to consist chiefly of the bummalos, a siluroid fish,—which sells in Calcutta, under the name of Bombay duck, at the rate of four or five rupees a hundred,—the Indian mullet, the sudjeh, begtí, and the above-mentioned kharrah, or Indian mackerel. Several specimens of my collection are from the sea-face of the Sunderbuns, where all these and many other serviceable species are found in abundance.

With a view to ascertain how far the locality and climate would favour the process of salting and drying fishes on the coasts of Bengal, Captain Richard Lloyd, who, as Marine Surveyor-General, always has evinced a strong desire to inquire into the natural products, and resources of those localities, which by his indefatigable zeal have been surveyed, caused a series of experiments to that

effect to be tried on board his own vessel. The materials submitted to trial were either purchased from fishermen at the rate of three rupees an hundred, or supplied by the nets belonging to the fishing-boat attached to the survey. The experiments turned out so satisfactorily, that I feel convinced that the process of curing, salting and drying fishes, may easily be accomplished there during the north-east monsoon, that is, during the period from 15th October to the 15th of April. A few details concerning the fishermen and their boats will serve to form an idea of the outlay an attempt of this sort would require. The men are all Hindús, villagers from the banks of the Hoogly, all in comparatively affluent circumstances, and upon the whole a superior description of Indian sailors. They build and rig the boats, and make themselves all the implements out of materials within reach, and of the cheapest description. The boats are, generally speaking, built of Sundry wood, *Heritiera fomes*, Buch, (*H. minor*, Roxb.) of a light make, and of a long, sharp shape, which makes them sail and pull equally easily; in both respects they hold the first rank among native craft. Their decks are like those of the common Dinghies, or river-boats, only they are seldom provided with a roof like the latter, for which is substituted a tarpaulin, affording to them but a sleeping shelter from sun and rain. Every boat is manned by the Manjí, generally the owner and steersman, who commands the crew, consisting of twelve to fourteen Dandies, who ply the paddles or raise the bamboo-mast as circumstances require.

The wages of each man vary from two to four rupees per month, besides the food. The men I have observed to be of much more industrious habits than the rest of the natives; they are seldom seen without some occupation, and their hours of leisure are either spent in mending their nets, or some other handiwork. The fishing-net, calculated to be dragged in shoal water, is made of twine, dyed in a solution of the bark employed by the Indian tanners under the name of Gáb (*Diospyros glutinifera*), and valued from twenty to forty rupees, according to size and materials. These boats, "tow-boats," as they are called, receive from the shipping above mentioned a pay of sixteen rupees per diem; by employing them regularly however, and for a length of time, their services may be had at a much cheaper rate: thus, for instance, the owner of the boat attached to the Survey received ninety rupees per month.

With regard to the salt required, I shall merely state that the sea-face of the Sunderbuns is the very locality where the Honourable Company's workmen are employed in this produce.

The demand for dried fish in Calcutta is always considerable enough to ensure the sale of a supply brought from the immediate vicinity of the market, and for this very reason saleable at a cheaper rate than is possible for that brought from a greater distance. A number of labourers might thus find profitable employment; and the sum annually carried away by the importers of this article, might be circulated amongst the inhabitants of Bengal.¹

¹ For the scientific names of the Sundry and the Gab trees, I am indebted to the kindness of Dr. Royle. My botanical collection from the Sunderbuns, I handed over to my friend, the eminent botanist, Mr. W. Griffith.
